## WHAT IS CLAIMED IS:

1. A network with a plurality of users, which is divided into several segments interconnected by at least one coupling device, characterized in that the at least one coupling device has means for measuring the predefined slot time in the users by means of so-called GAP queries with which the active users using the PROFIBUS DP protocol for data transmission cyclically check whether new users have been connected to the network, wherein the slot time is the time for which an active user waits after a GAP query for a reply message from a polled user.

2. The network as claimed in Claim 1, characterized in that at least one active user is configured in such a way that it executes cyclical GAP queries to a non-existent user.

3. The network as claimed in Claim 1, characterized in that the slot time predefined in the users is at least twice the time that elapses at maximum in an optical double ring between sending a GAP query message and receiving a reply message.

4. The network as claimed in Claim 1, characterized in that the network is divided into at least three segments with bidirectional data transmission, wherein a first segment and a second segment are interconnected

by a first coupling device, and wherein the second segment and a third segment are interconnected by a second coupling device, that the first coupling device has means for detecting any corruption of a message through faults on the second segment and after detection of a fault to block the forwarding to the first segment of messages received in the second segment, and that the second coupling device has means to block the forwarding to the third segment of messages received in the second segment upon detection of a block of the forwarding of messages by the first coupling device.

5. The network as claimed in Claim 4, characterized in that the first coupling device has means for blocking the forwarding of messages to the second segment upon detection of a fault in the second segment for at least a predefined time, the so-called minimum segmentation time, that the second coupling device has a device for monitoring transmission activities on the second segment, which checks compliance with a maximum idle time on the second segment, which preferably is half the measured slot time, and if the maximum idle time is exceeded, blocks the forwarding to the third segment of messages received on the second segment, and that the minimum segmentation time is greater than the maximum idle time.

6. The network as claimed in Claim 4, characterized in that forwarding by the first coupling device is blocked only after determination of a predefined number of errors.

7. The network as claimed in Claim 4, characterized in that the means for detecting message corruption are configured such that an error is detected if a signal level in a received message persists longer than a predefined time.

8. The network as claimed in Claim 7, characterized in that an error is detected if in a received message the signal level remains on a low level for 13 consecutive bit times.

9. The network as claimed in Claim 4, characterized in that the means for detecting message corruption are configured such that an error is detected if more than a predefined number of characters are contained in a received message.

10. The network as claimed in Claim 9, characterized in that an error is detected if more than 262 characters are contained in a received message.

11. The network as claimed in Claim 4, characterized in that the second coupling device has means for supplementing a message to be forwarded from the third segment to the second segment, irrespective of possibly present control information valid on the third segment, by control information valid on the second segment, which is adapted to the message sent on the second segment, so that the first coupling device connected to the second segment can

evaluate the control information to assess the transmission quality on the second segment.

12. The network as claimed in Claim 11, characterized in that the first coupling device has means for generating control information for a message received on the second segment, comparing the generated control information with the received control information, and indicating an error in case of a mismatch between the two.

13. The network as claimed in Claim 12, characterized in that the first coupling device has means for blocking the forwarding to the third segment of the messages received on the second segment in case of a mismatch between the two.

14. The network as claimed in Claim 11, characterized in that the control information is a CRC (Cyclic Redundancy Check) character.

15. The network as claimed in Claim 14, characterized in that the CRC character comprises 5 bits.

16. The network as claimed in Claim 14, characterized in that the second coupling device has means for supplementing the message by an

additional stop bit and sending the control information immediately after the additional stop bit.

17. The network as claimed in Claim 4, characterized in that the second coupling device has means for unblocking the forwarding if a check of the transmission quality on the second segment by special messages transmitted via the second segment from the first coupling device to the second coupling device and vice versa shows good transmission quality.

18. The network as claimed in Claim 17, characterized in that the first and the second coupling device have means for performing a handshake procedure to check the transmission quality on the second segment by special messages in which,

(a) the first coupling device, after expiration of the minimum segmentation time, sends a first special message (ST1) via the second segment to the second coupling device;

(b) the second coupling device in case of error-free receipt of the first special message (ST1) returns a second special message (ST1) via the second segment to the first coupling device,

(c) the first coupling device in case of error-free receipt of the second special message (ST1) sends a third special message (ST2) via the second segment to the second coupling device, and

(d) the second coupling device in case of error-free receipt of the third special message (ST2) returns a fourth special message (ST2) via the second segment to the first coupling device, and

that means are present for reinitiating the handshake procedure if the time between sending a first special message and receiving a returned second special message is greater than a predefined maximum time.

19. A coupling device for connecting two segments in a network as claimed in Claim 1, characterized in that the coupling device has means for measuring the predefined slot time in the users by means of so-called GAP queries with which active users using the PROFIBUS DP protocol for data transmission cyclically check whether new users have been connected to the network, wherein the slot time is the time for which an active user waits after a GAP query for a reply message from a polled user.

20. A network with a plurality of users, which is divided into at least three segments with bidirectional data transmission, wherein a first segment and a second segment are interconnected by a first coupling device and wherein the second segment and a third segment are interconnected by a second coupling device, and the first coupling device has means for detecting corruption of a message through faults on the second segment and, after detection of an error, blocking the forwarding of messages received on the second segment to the first segment, characterized in that the second coupling device has means for

blocking the forwarding of messages received on the second segment to the third segment upon detection of a block of the forwarding of messages by the first coupling device.

21. The network as claimed in Claim 20, characterized in that the first coupling device has means for blocking the forwarding of messages to the second segment for a predefined time, the so-called minimum segmentation time, upon detection of a fault on the second segment, that the second coupling device has means for monitoring the transmission activities on the second segment, which checks compliance with a predefined maximum idle time on the second segment, and if said maximum idle time is exceeded, blocks the forwarding of messages received on the second segment to the third segment, and that said minimum segmentation time is greater than the maximum idle time.

22. The network as claimed in Claim 20, characterized in that the forwarding by the first coupling device is blocked only after a predefined number of errors has been ascertained.

23. The network as claimed in Claim 20, characterized in that the means for detecting message corruption are configured such that an error is detected if a signal level in a received message persists longer than a predefined time.

24. The network as claimed in Claim 23, characterized in that an error is detected if in a received message the signal level remains on a low level for 13 consecutive bit times.

25. The network as claimed in Claim 20, characterized in that the means for detecting message corruption are configured such that an error is detected if more than a predefined number of characters are contained in a received message.

26. The network as claimed in Claim 25, characterized in that an error is detected if more than 262 characters are contained in a received message.

27. The network as claimed in Claim 20, characterized in that the second coupling device has means for supplementing a message to be forwarded from the third segment to the second segment, irrespective of possibly present control information valid on the third segment, by control information valid on the second segment, which is adapted to the message sent on the second segment, so that the first coupling device connected to the second segment can evaluate the control information to assess the transmission quality on the second segment.

28. The network as claimed in Claim 27, characterized in that the first coupling device has means for generating control information for a message

received on the second segment, comparing the generated control information with the received control information, and indicating an error in case of a mismatch between the two.

29. The network as claimed in Claim 28, characterized in that the first coupling device has means for blocking the forwarding to the third segment of the messages received on the second segment in case of a mismatch between the two.

30. The network as claimed in Claim 27, characterized in that the control information is a CRC (Cyclic Redundancy Check) character.

31. The network as claimed in Claim 30, characterized in that the CRC character comprises 5 bits.

32. The network as claimed in Claim 30, characterized in that the second coupling device has means for supplementing the message by an additional stop bit and sending the control information immediately after the additional stop bit.

33. The network as claimed in Claim 20, characterized in that the second coupling device has means for unblocking the forwarding if a check of the transmission quality on the second segment by special messages transmitted

via the second segment from the first coupling device to the second coupling device and vice versa shows good transmission quality.

34. The network as claimed in Claim 33, characterized in that the first and the second coupling device have means for performing a handshake procedure to check the transmission quality on the second segment by special messages in which,

(a) the first coupling device, after expiration of the minimum segmentation time, sends a first special message (ST1) via the second segment to the second coupling device;

(b) the second coupling device in case of error-free receipt of the first special message (ST1) returns a second special message (ST1) via the second segment to the first coupling device,

(c) the first coupling device in case of error-free receipt of the second special message (ST1) sends a third special message (ST2) via the second segment to the second coupling device, and

(d) the second coupling device in case of error-free receipt of the third special message (ST2) returns a fourth special message (ST2) via the second segment to the first coupling device, and

that means are present for reinitiating the handshake procedure if the time between sending a first special message and receiving a returned second special message is greater than a predefined maximum time.

35. The coupling device for connecting two segments in a network as claimed in Claim 20, wherein the coupling device has means for detecting corruption of the message by faults on the second segment and, after detection of an error, blocking the forwarding of messages received on the second segment to the first segment, characterized in that the coupling device has means for blocking the forwarding of messages to the second segment for a predefined time, the so-called minimum segmentation time, upon detection of an error on the second segment, that the coupling device has means for monitoring the transmission activities on the second segment, which checks compliance with a predefined maximum idle time on the second segment and, if said maximum idle time is exceeded, blocks the forwarding of messages received on the second segment to the first segment and the second segment, and that the minimum segmentation time is greater than the maximum idle time.